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**IS : 8164 • 1976**

*Indian Standard*  
**SPECIFICATION FOR  
HOSPITAL RUBBER SHEETING  
WITHOUT REINFORCING FABRIC**

UDC 678·4·41 : 615·478·275



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MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002

*December 1976*

**AMENDMENT NO. 1    JANUARY 1990**  
**TO**  
**IS : 8164 - 1976 SPECIFICATION FOR HOSPITAL**  
**RUBBER SHEETING WITHOUT REINFORCING**  
**FABRIC**

( *Page 4, clause 2.2* ) — Add the following in the end:

**The sheeting shall have a minimum thickness of 1 mm and shall be uniform in thickness.'**

[ *Page 5, Table 1, Sl No. (vi), col 5* ] — Substitute the following for the existing matter:

**'IS : 7016 ( Part VII ) - 1973\*, Using Low Pressure Method',**

( *Page 6, clause 2.4* ) — Add the following new clause after 2.4:

**'2.5 Preservation — The sheeting shall be properly dusted with a suitable preservative to avoid stickiness. French chalk is a suitable preservative. Other treatment may be given if agreed to between the purchaser and the supplier.'**

( PCDC 13 )

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TO  
IS 8164 : 1976 SPECIFICATION FOR HOSPITAL  
RUBBER SHEETING WITHOUT  
REINFORCING FABRIC**

*[Page 4, clause 2.3, Table 1, Sl No (iii), col 2] — Substitute 'Min' for  
'Max'*

(PCD 13)

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Reprography Unit, BIS, New Delhi, India

# Indian Standard

## SPECIFICATION FOR HOSPITAL RUBBER SHEETING WITHOUT REINFORCING FABRIC

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( Continued on page 2 )

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*Indian Standard*  
**SPECIFICATION FOR  
HOSPITAL RUBBER SHEETING  
WITHOUT REINFORCING FABRIC**

**0. FOREWORD**

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 28 June 1976, after the draft finalized by the Rubber Products Sectional Committee had been approved by the Chemical Division Council.

**0.2** Rubber sheetings both with and without reinforcing fabric are commonly used in hospitals. Rubber sheetings having cotton or synthetic fabric coated on both sides with rubber are covered in IS 4135-1974\*. The present standard covers only the rubber sheeting without any reinforcing fabric.

**0.3** This standard contains clauses 2.1.2, 2.4 and 3.1 which call for agreement between the purchaser and the supplier

**0.4** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS: 2-1960†. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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**1. SCOPE**

**1.1** This standard prescribes the requirements, and methods of sampling and test for plain rubber sheetings without any reinforcing fabric, for use in hospitals.

**2. REQUIREMENTS**

**2.1 Materials** — The sheeting shall be made from natural rubber or suitable synthetic rubber or combination thereof, compounded with necessary ingredients so that the rubber sheeting conforms to all the requirements of the specification.

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\*Specification for hospital rubber sheetings (*first revision*)

†Rules for rounding off numerical values (*revised*)

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**2.1.1** The rubber sheeting shall not contain any substances injurious to human body or having any deleterious effect on the rubber polymer.

**2.1.2** The colour of the rubber sheeting shall be as agreed to between the purchaser and the supplier.

**2.2 Workmanship and Finish** — The rubber sheeting shall be smooth, soft and pliable. It shall be free from pinholes, cuts, embedded foreign matter, surface irregularities, objectionable stains or odour. The workmanship shall be consistent with good manufacturing practice.

**2.3** The rubber sheeting shall also conform to the requirements given in Table 1.

**TABLE 1 REQUIREMENTS FOR HOSPITAL RUBBER SHEETING WITHOUT REINFORCING FABRIC**

Sl. No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST, REF TO	
			Appendix	Indian Standard
(1)	(2)	(3)	(4)	(5)
i)	Mass, g/m <sup>2</sup>	800 to 1000	—	IS : 7016 (Part I)-1973*
ii)	Tensile strength, MN/m <sup>2</sup> (approx kgf/cm <sup>2</sup> ), Min	14 (140)	—	IS : 3400 (Part I)-1965†, The thickness of the test specimen shall be same as single thickness of the product
iii)	Elongation at break, percent, Max	350	—	do
iv)	Tension set at 250 percent elongation and 15 min recovery time, percent, Max	10	—	IS : 3400 (Part XIII)-1972‡, Using strip test pieces with enlarged ends and of thickness same as single thickness of the product
v)	Accelerated ageing at 70°C for 168 hours in air oven.		—	IS : 3400 (Part IV)-1965§
a)	Change in tensile strength from original, percent, Max	+10 —25		

\*Methods of test for coated and treated fabrics: Part I Determination of roll characteristics.

†Methods of test for vulcanized rubbers: Part I Tensile stress-strain properties

‡Methods of test for vulcanized rubbers: Part XIII Tension set

§Methods of test for vulcanized rubbers: Part IV Accelerated ageing

(Continued)

**TABLE 1 REQUIREMENTS FOR HOSPITAL RUBBER SHEETING  
WITHOUT REINFORCING FABRIC—Contd**

Sl No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST, REF TO	
			Appendix	Indian Standard
(1)	(2)	(3)	(4)	(5)
	b) Change in elongation at break from original, percent, <i>Max</i>	+ 0 —25		
vi)	Waterproofness under 300 mm head of water	There shall be no percolation or wet patches on the surface in contact with air	—	IS : 7016 (Part VII) - 1973*
vii)	Colour fastness to washing	Rating shall not be less than 5	—	IS : 765-1966†
viii)	Colour fastness to light	Rating shall not be less than 3	—	IS : 2454-1967 ‡
ix)	Autoclaving test:		A	—
	a) Change in tensile strength from original, percent, <i>Max</i>	+10 —25		
	b) Change in elongation at break from original, percent, <i>Max</i>	+10 —15		
x)	Reaction of aqueous extract	The extract shall neither be acidic to methyl orange nor alkaline to phenolphthalein	B	—
xi)	Resistance to detergents and disinfectants	The test pieces shall not show any tackiness or other apparent deterioration	C	—

\*Methods of test for coated and treated fabrics. Part VII Determination of waterproofness.

†Methods for determination of colour fastness of textile materials to washing: test 4 (*revised*).

‡Method for determination of colour fastness of textile materials to artificial light (xenon lamp).

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**2.4 Length and Width** — The length of the rubber sheeting shall not be less than 20 metres unless otherwise agreed to between the purchaser and the supplier. Similarly unless otherwise agreed to, the width of the sheeting shall be  $90 \pm 1$  cm. The length and the width shall be determined in accordance with the method given in IS : 7016 ( Part I )-1973\*.

### **3. PACKING AND MARKING**

**3.1 Packing** — The rubber sheetings shall be packed as agreed to between the purchaser and the supplier.

**3.2 Marking** — Each piece of rubber sheeting shall be indelibly and clearly marked at one end with:

- a) Manufacturer's name or trade-mark, if any;
- b) *Month and year of manufacture and batch number; and*
- c) Length and width.

**3.2.1** The rubber sheeting may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution ( Certification Marks ) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

### **4. SAMPLING**

**4.1** For the purpose of ascertaining conformity of the sheeting in a consignment, the scale of sampling and criterion for conformity shall be as prescribed in Appendix D.

## **A P P E N D I X   A**

[ *Table 1, Item (ix)* ]

### **AUTOCLAVING TEST**

#### **A-1. PROCEDURE**

**A-1.1** Subject dumbbell test pieces cut from the sample to steam pressure of  $0.1 \text{ MN/m}^2$  ( approx  $1 \text{ kgf/cm}^2$  ) for 20 minutes in an autoclave after

\*Methods of test for coated and treated fabrics Part I Determination of roll characteristics.

removal of air. Take out the test pieces from the autoclave and expose them to air at room temperature for 2 hours. Repeat the autoclaving process after which blot out the adhering water from the test pieces and condition them for 24 hours in air at  $27 \pm 2^\circ \text{C}$  and  $65 \pm 5$  percent relative humidity. The test pieces are then subjected to tensile and elongation at break test according to IS : 3400 ( Part I )-1965\*.

## APPENDIX B

[ Table 1, Item (x) ]

### REACTION OF AQUEOUS EXTRACT

#### B-1. PROCEDURE

**B-1.1** Weigh 10 g of the sample, cut into small pieces approximately 3 mm<sup>2</sup> in area, into a chemically resistant glass flask and add 300 ml of water. Fit the flask with a water-cooled reflux condenser with ground-glass connection and heat the water to boiling point. Continue boiling for half an hour. Detach the flask from the condenser, cover immediately to prevent any possible contamination and cool the contents to room temperature. Check the reaction of aqueous extract to methyl orange and phenolphthalein.

## APPENDIX C

[ Table 1, Item (xi) ]

### TEST FOR RESISTANCE TO DETERGENTS AND DISINFECTANTS

#### C-1. REAGENTS

**C-1.1 Phenol** — saturated aqueous solution of phenol ( see IS : 538-1968† ).

**C-1.2 Ammonia Solution** — relative density 0.9 ( see IS : 799-1955‡ ).

**C-1.3 Soap Solution** — 5 percent aqueous solution of soap ( m/v ) conforming to Type 1 of IS : 285-1974§.

#### C-2. PROCEDURE

**C-2.1** Take three samples of the finished sheeting. Immerse one in each of the specified reagents for the length of time and temperature stated

\*Methods of test for vulcanized rubbers: Part I Tensile stress-strain properties.

†Specification for phenol ( carbolic acid ) ( first revision ).

‡Specification for ammonia, liquor, technical.

§Specification for laundry soaps ( second revision ).

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below. After immersion, examine the pieces visually.

<i>Immersion Medium</i>	<i>Time, Min</i>	<i>Temperature</i>
Phenol solution	15	$27 \pm 2^{\circ}\text{C}$
Ammonia solution	30	$27 \pm 2^{\circ}\text{C}$
Soap solution	10	Boiling temperature

**APPENDIX D**

( Clause 4.1 )

**SAMPLING OF HOSPITAL RUBBER SHEETING WITHOUT  
REINFORCING FABRIC**

**D-1. SCALE OF SAMPLING**

**D-1.1 Lot** — All the hospital rubber sheetings in a single consignment belonging to a single batch of manufacture shall be grouped together to constitute a lot.

**D-1.2** Samples shall be tested separately for each lot for ascertaining the conformity of the lot to the requirements of this specification. The number of samples to be selected for this purpose shall be in accordance with Table 2.

**TABLE 2 SCALE OF SAMPLING**

<b>NO. OF ROLLS IN A LOT</b>	<b>NO. OF ROLLS TO BE SELECTED</b>
(1)	(2)
2 to 8	2
9 „ 25	3
26 „ 100	5
101 „ 300	8
301 „ 1 000	13
1 001 and above	20

**D-1.3** The selection of rolls from a lot shall be done at random. To ensure the randomness of selection, random number tables ( see IS : 4905-1968\* ) shall be used. In case random number tables are not available the following procedure may be adopted:

Starting from any roll in the lot, count them in one order as 1, 2, 3, ....., etc, up to  $r$  and so on, where  $r$  is the integral part of  $N/n$ ,  $N$  being the number of rolls in the lot and  $n$  the number of rolls to be selected. Every  $r$ th roll shall be taken to constitute the sample.

\*Methods for random sampling.

**D-2. NUMBER OF TESTS AND CRITERION FOR CONFORMITY**

**D-2.1** Every one of the rolls selected in **D-1.2** shall be examined for all the requirements of this specification individually. For this purpose, from each roll a full width piece of 450 mm in length shall be cut leaving at least half a metre from the end. The test pieces for all the tests shall be taken from this piece.

**D-2.2** The lot shall be considered to satisfy the requirements of this specification if none of the rolls selected and tested fails in any of the requirements of this specification.

**INDIAN STANDARDS**  
**ON**  
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3692-1975	Rubber closures ( pharmaceutical ) ( <i>first revision</i> )
3701-1966	Rubber protective sheaths ( condoms )
3867-1966	Rubber ice bags
4135-1974	Hospital rubber sheetings ( <i>first revision</i> )
4148-1967	Surgical rubber gloves
4149-1967	Post-mortem rubber gloves
5680-1969	Rubber tubing for medical use
5783-1970	Rubber ward-dressing and porters' gloves
6058-1970	Rubber components for transfusion fluid bottles
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